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SCIENTIFIC NOTE

Immigration of *Phyciodes mylitta* to Vancouver Island, British Columbia (Lepidoptera: Nymphalidae)—The butterfly fauna of southern Vancouver Island, British Columbia is the most thoroughly studied of any area on the west coast of North America except the San Francisco and Los Angeles regions of California. There has been one or more resident Lepidopterist continuously from 1884 to the present, as follows: C. W. Taylor (Victoria & Nanaimo, 1884-1912); W. H. Danby (Victoria, 1890's); C. D. Green (Victoria, 1890's); E. H. Blackmore (Victoria, ?1900-1928); E. M. Anderson (Victoria, 1904-1916); G. O. Day (Duncan, 1906-1941); R. V. Harvey (Victoria, 1909-1917); G. A. Hardy (Victoria, 1924-1965); J. F. G. Clarke (Victoria, ?1925-1934); J. R. L. Jones (Duncan, 1931-1953); R. Guppy (Thetis Island, 1944-present).

In all papers up to 1962 discussing the butterflies of Vancouver Island or the province as a whole no mention was made of *Phyciodes mylitta* (Edwards) occurring on Vancouver Island. Harvey (1907, Ent. Soc. B. C. Quart. Bull. 7:2-3) made specific reference to the absence of *P. mylitta* on Vancouver Island. No specimens dated earlier than 1958 are known. Thus it would appear that *P. mylitta* is a species which has managed to immigrate to Vancouver Island in historical times.

This record of colonization of an island by a species of butterfly that was native to the adjacent continental mass appears to be unique for the Pacific Coast of North America. A possible exception is *Phoebis sennae* L. recorded from Santa Catalina Island (Meadows, 1936, Bull. S. Calif. Acad. Sci. 35:175-180). *P. sennae* was introduced to Santa Catalina Island. However, it is not known for sure if it is native to the adjacent mainland. The only other species of butterfly known to have colonized any island off the west coast in recorded history is *Pieris rapae* (L.), an introduced pest species of European origin.

Therefore it is of interest to pursue the facts concerning presence and food plants of *Phyciodes mylitta* on Vancouver Island and the adjacent mainland.

Hardy (1962, Proc. Ent. Soc. B. C. 59:14) first published records of *P. mylitta* on Vancouver Island from "the general area of Coldstream". Coldstream was a misprint of Goldstream, a favorite collecting locality of Vancouver Island Lepidopterists. Specimens of *P. mylitta* in the B.C. Provincial Museum are as follows: Goldstream, Sept. 18, 1961, G. A. Hardy (1♂); Thetis Lake, Sept. 2, 1961, G. A. Hardy (1♀). In 1962, 1963, and 1964 Hardy continued to observe *P. mylitta* including rearings (Hardy, 1964, Proc. Ent. Soc. B. C. 61:31-36).

The Pacific Forest Research Centre (Victoria) collection contains earlier records of *P. mylitta* from Vancouver Island. These specimens were all captured at Langford, a subdivision of Victoria, July 23, 1958 to July 27, 1964, D. Evans.

Guppy (1974, J. Lep. Soc. 28(3):223) published further records from Vancouver Island in 1972 and 1973. These include Duncan and Chemainus (40 miles north of Victoria). These records likely represent a northward dispersal from Victoria. J. Jones' home was at

Cobble Hill near Duncan (20 miles north of Victoria). He collected all along the east coast of Vancouver Island north to Parksville (90 miles north of Victoria) until 1953. Jones never captured *P. mylitta* at Duncan, Chemainus, or any other point of Vancouver Island (Jones (1951, Ent. Soc. B. C. Occ. Pap. 1:1-148) and collections of J. Jones at B. C. Provincial Museum and University of British Columbia).

Hardy (1964, above) established the fact that *P. mylitta* was double brooded and the food plant as *Cirsium arvense* (L.) Scop. (Canada Thistle). Specimens in the B. C. Provincial Museum indicate that the rearing was done from eggs of females captured at Francis Park, Victoria. These observations are consistent both in number of generations per year and food plant for *P. mylitta* at adjacent mainland localities of British Columbia and Washington.

There are two native species of *Cirsium*, *C. brevistylum* Cronq. and *C. edule* Nutt., on Vancouver Island. However *P. mylitta* has never been collected at a locality near native *Cirsium*, which are confined to the foothills and streams, (Moore and Frankton, 1962, Can. J. Bot. 40:1187-1196). *Phyciodes mylitta* has been found only in open, disturbed park areas where the weed *Cirsium arvense* is always present. That *P. mylitta* is always associated with an introduced weed and not native thistles is further evidence that the butterfly is a recent immigrant.

It is also possible that *Phyciodes mylitta* is not native to the lower mainland of B. C. or the Puget Sound of Washington State. Here the species is also associated with introduced *Cirsium* sp. and has not yet been associated with native *Cirsium* sp.

Cirsium arvense has been established on the coastal mainland of British Columbia and Washington (Clark and Fletcher, 1909 Farm weeds of Canada, 2nd ed. Can. Dept. Agric. 192 pp.) (Piper, 1906 Flora of the state of Washington. U.S. Nat. Mus. Cont. 11:[1]-637.) since the 1890's. *Cirsium arvense* has been established on Vancouver Island since at least 1895 (B. C. Prov. Mus. Records). *Phyciodes mylitta* has been present in Vancouver since at least 1902 (Vancouver, B. C., Aug. 25, 1902, R. V. Harvey, B. C. Prov. Mus.) and at Bellingham since at least 1917 (Bellingham, Wash., May 18, 1917, J. F. G. Clarke, Washington State Univ. Collection). It has been recorded from Orcus Island and Anacortes in recent years (Pyle, 1975, personal correspondence).

Why did *P. mylitta* not appear on Vancouver Island shortly after the advent of *Cirsium arvense*? This question was implicit in Harvey (1907 above). Guppy (1974 above) attempted to associate drier weather conditions with the introduction. A careful examination of the weather data (B. C. Climate, 1941-1972 Queens Printer, Victoria) shows that there have been several fluctuations in the weather on Vancouver Island. None of the dry periods are directly associated with the first record of *P. mylitta* on Vancouver Island. Guppy (1974, above) mentioned the concurrent spread of *Coenonympha tullia insulana* McDunnough from Victoria (type locality) since 1965. In reality, this species was first collected outside of Victoria in 1952 (Island View Beach, nr. Duncan, Sept. 2, 1952, G. A. Hardy, B. C. P. M.).

Examination of the human population growth on Vancouver Island gives a much more convincing explanation for the first occurrence of *Phyciodes mylitta* on Vancouver Island and the earlier but almost concurrent spread of *Coenonympha tullia*. About 1950, Vancouver Island began to experience a huge increase in population outside the immediate vicinity of Victoria (Canada Yearbook, 1871-1971 The Canada Year Book. Queens Printer, Ottawa). This brought much larger areas into suburban housing and farming use. Concurrently there was a spread of the weedy habitat preferred by *P. mylitta*. In the case of *C. tullia* this provided adjacent habitat for easy dispersal of the species.

For *P. mylitta*, it meant that a much larger proportion of Vancouver Island was suitable habitat. Thus individuals, whether introduced by man, wind dispersed, or flying to the Island from the surrounding mainland areas, could have a greater chance of finding appropriate habitat and establishing the species on Vancouver Island.

It would appear that the recent colonization of Vancouver Island by *Phyciodes mylitta* has been realized because of interference by man. First the disturbed habitat allowed *Cirsium arvense* to be established. Then further disturbance allowed the dispersal and increased numbers of the food plant to the point where a chance arrival of *Phyciodes mylitta* to the island was able to establish the species. — JON H. SHEPARD, R. R. 2, Nelson, British Columbia.